



OPERATING INSTRUCTIONS

Automatic charger FR

Index

- 1.0 General safety instructions
- 2.0 Technical data
- 3.0 Installation and connections
 - 3.1 Mains connection
- 4.0 Putting the charger into operation
 - 4.1 Switching on the unit
 - 4.2 Connecting the battery
- 5.0 Charging
 - 5.1 Indication of state of charge
 - 5.2 Mains supply failure
- 6.0 End of charging
- 7.0 Automatic freshen-up charge
 - 7.1 Equalizing charge
- 8.0 LVS Air supply system (option)
- 9.0 Water topping-up system (option)
- 10.0 DC power supply 12 V / 2 A (option)
- 11.0 AC power supply 230 V / 2 A (option)
- 12.0 DC power supply for control electronic (option)
- 13.0 Remote display with relay contact (option)
- 14.0 LCD Indicator (option)
- 15.0 Time module (option)
- 16.0 Maintenance
- 17.0 Failure
- 18.0 Circuit diagram
- 19.0 Annex

Operating instructions for Automatic Charger FR

1.0 General safety instructions



For your own safety carefully read these operating instructions before putting the charger into operation. The unit must be operated in accordance with these instructions.

Keep the operating instructions carefully!

The relevant DIN and VDE (Association of German Electrical Engineers) regulations, especially DIN VDE 0510, Part 3, form the base for operation and handling.



ATTENTION! Disconnect main cable before opening the unit!
Keep the charger dry!

2.0 Technical data

Characteristic:	IUIa-characteristic DIN 41773
Charging system FR:	Charging electronics controlled by microcontroller. Optimum charge at any degree of discharge. Display: Readiness for service, charging, end of charging, fault (charger) fault P (pump) Automatic start after connection of the battery Safety shutdown Automatic freshen-up charge Equalizing charge Desulphation function Starting charging/interrupting charging via remote control Serial interface Turn on delay Analysed and defined fault signal via PC Automatic change of charging factor when using the LVS air supply system
Ambient temperature:	max. 40° C
Type of protection:	IP21, DIN 40050, water drop protection
Cooling:	self-cooling
Mains voltage:)
Current input:) see
Rated charging voltage:) rating plate
Rated charging current:)

Options	Provided for connecting the LVS air supply system Automatic activation of the water topping-up system DC power supply 12 V / 2 A AC power supply 230 V / 2 A Remote display of the state of charge LCD Indicator (voltage, current, capacity) Pilot contact Time module DC power supply for the control electronic at mains failure
----------------	---

3.0 Installation and connections

The charger is intended for use indoors in enclosed rooms. It must not be installed near radiators or other hot sources. It should not be exposed to air containing chemically corrosive substances or excessive dust. Leave sufficient space around the charger to allow cooling air to flow freely through it. Air openings are located in the bottom, on the rear wall and where applicable on the side walls. Maintain a minimum lateral interval of approx. 50 cm and interval of approx 10 cm to the rear wall. Do not stack units. Ensure correct polarity (plus and minus) when connecting the charging connectors. Connect the red charging cable to the plus (+) charging connector and the other charging cable to the minus (-) charging connector.



ATTENTION! When charging batteries, oxyhydrogen gas can be generated. Only charge them in well ventilated rooms. Avoid open fire and sparks (DIN VDE 0510, part 3)!



ATTENTION! When handling electrolytes take note of the operating instructions of the battery. Always wear protective glasses, protective gloves and protective clothing!

For safety reasons the distance between charger and battery must amount to at least 1 m.

The mains cable and the charging cable must be in perfect condition. When the connecting cable is damaged, the after sales service is to be demanded to exchange the cable.

Put the charger horizontally on firm ground. If the charger is put in places such as shelves, this place must be stable enough. Pay attention to the weight of the charger (see annex)! Do not cover the charger!

3.1 Mains connection

The mains voltage must agree with the indication of the mains voltage on the rating plate. The rating plate is at the inside of the front door.



The supply lead to the charger is to be fused! This fuse must have a slow tripping characteristic. When automatic circuit-breakers are used, these must have a type G or type K tripping characteristic.

For dimensioning of the fuse attention must be paid to the rated current of the charger (see annex).

4.0 Putting the charger into operation

4.1 Switching on the unit

Switch on the charger by the mains switch. When the unit is switched on, the green rocker in the mains switch is illuminated. The yellow LED „charging“ flashes - „Ready for operation“.

4.2 Connecting the battery

After connection of the charging connectors the charger switches on automatically after a short time. The yellow LED „Charging“ lights up.

When connecting the charger ensure good contact of the charging cables. A poor contact - e.g. at the charging connectors - can cause constant faults and consequently interrupt the charging operation.

When connecting the battery pay attention that the battery voltage corresponds to the data on the rating plate. Pay attention to correct polarity!

5.0 Charging

Charging is carried out with the specified charging program following an IU1a characteristic DIN 41773.

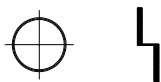
5.1 The state of charge is indicated by 4 LED's:



Unit charges:
LED „Charging“ (yellow) lights during the charging phase

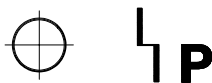


Unit has completed the charging:
LED „Charging completed“ (green)
- lights up after charging is completed



Unit indicates a fault:
LED „Fault“ (red)
- **blinks** when there is a fault in the charger or in the electronics
- **lights** when there is a battery fault, a wrong battery or when the safety time limits are exceeded

In case of mains failure the red and yellow LED blink (only three-phase chargers)



LED „Fault P“ (orange) - (LED is always fitted).
Only when LVS is connected the indication operates as follows:
- blinks if a leak in the LVS air system occurs,
- lights continuously if the minimum pressure will not be attained or if the maximum pressure is exceeded.



When the malfunction has been remedied after a fault signal, the charging process must be commenced again in order to restart the LVS air supply system.

5.2 Mains supply failure

A mains supply failure interrupts the charging. The LEDs and the rocker do not light. As soon as power is restored, the charger starts a new charging cycle.

6.0 End of charging



The charging is switched off automatically after the battery reached the finishing rate X. The green LED „end of charging“ lights up.

ATTENTION! Do not disconnect the battery from the charger during the charging.

7.0 Automatic freshen up charge

After the charging operation a freshen-up charge is carried out in certain intervals. The LED „Charging“ (yellow) and the LED „End of charging“ (green) light up.

7.1 Equalizing charge

If programming „Equalizing charge“ is selected, the freshen up charge will not take place, but immediately after the end of charging an automatically equalizing charge - I₂ characteristic - will start once for 8 hours. The yellow LED „Charge“ and the green LED „End of charge“ illuminate. After that the automatic equalizing charge will start in predetermined intervals.

8.0 LVS Air supply system (option):

The air supply system LVS is used to supply lead-acid batteries with air for electrolyte circulation during the charging process. The unit is integrated inside of the charger and is fitted with a charge factor selection.

When the charging process commences, the air pump switches on and operates in a pulse mode until the charging process is completed or a fault occurs (see 5.1, fault P). The air intake filter should be cleaned from time to time.

9.0 Water topping-up system (option)

At a pre-programmed time the water topping-up relay switches on for 5 minutes, if a minimum charge occurred during the main charging time.

The operating point for the water topping up system in % of the secondary charging can be changed by PC.

10.0 DC power supply 12 V / 2 A (option)

Car standard socket for operating 12 V DC-devices or in connection with the WNS water topping-up system to operate a 12 V water topping-up pump.

11.0 AC Power supply 230 V / 2 A (option)

To operate external 230 V AC consumers.

12.0 DC power supply for control electronic (option)

The additional power supply for the control electronics keeps charging information during mains failure.

13.0 Remote display with relay contact (option)

The state of operation will be transmitted to a charging station. The indications can be transmitted by a potential free relay contact (30 W DC).

14.0 LCD Indicator (option)

Status indicator of the charging process. A 3-digit LCD indicator is integrated in the door of the charger. The indication changes between voltage per cell, I_{Nenn} in % of the current rating and the charging capacity in % of the general capacity. After the charging is completed the indicator shows the charging capacity (in % of the general capacity).

15.0 Time module (option)

- Indication in real time (date and time) in order to simplify the evaluation of the charging period.
- Programming of the turn-on control (date and time) in order to take advantage of energy-saving tariffs.
- Optional connection of a temperature sensor (type KTY-81-210) to save the battery in order to interrupt the charging process at a limited temperature. Additional the gassing voltage will be adjusted in relation to the battery temperature.

The time module has a back-up for 5 years in case of mains failure. After that time the battery of the time module has to be changed and the module has to be set up again.

16.0 Maintenance

The charger requires no maintenance. It is, however, suitable to clean the charger inside of dust at appropriate intervals when it is disconnected from the mains.

17.0 Failure - see trouble-shooting guide.

18.0 Circuit diagram

The corresponding circuit diagram is on the back of the passport unit.

Note: We reserve the right to change technical specifications without notice in the course of development.

19.0 Annex

List of types of chargers

Battery Voltage V	Nominal Current of Unit A	Type	M a i n s c o n n e c t i o n			Housing Type	Weight kg
			Voltage V	Current A	Fuse A		
12	20	E 12/ 20 B-FR	230	2,2	16	T73	26
	25	E 12/ 25 B-FR	230	2,8	16	T73	32
	30	E 12/ 30 B-FR	230	3,4	16	T73	32
24	15	E 24/ 15 B-FR	230	3,0	16	T73	33
	20	E 24/ 20 B-FR	230	4,1	16	T73	34
	25	E 24/ 25 B-FR	230	5,2	16	T73	35
	30	E 24/ 30 B-FR	230	6,5	16	T73	37
	40	E 24/ 40 B-FR	230	9,0	16	T73	39
	50	E 24/ 50 B-FR	230	11,4	16	T73	41
	60	E 24/ 60 B-FR	230	14,3	16	T73	48
	70	D 24/ 70 B-FR	2x400	9,6	16	T73	52
	80	D 24/ 80 B-FR	2x400	11,0	16	T73	56
	90	D 24/ 90 B-FR	2x400	12,5	16	S76	79
	100	D 24/100 B-FR	2x400	13,7	16	S76	79
	120	D 24/120 B-FR	2x400	15,8	16	S76	90
	140	D 24/140 B-FR	3x400	11,0	16	S76	103
	160	D 24/160 B-FR	3x400	12,0	16	S77	120
	180	D 24/180 B-FR	3x400	13,7	16	S77	135
	200	D 24/200 B-FR	3x400	15,0	16	S77	158
	225	D 24/225 B-FR	3x400	16,0	20	S77	158
36	20	E 36/ 20 B-FR	230	6,5	10	T73	38
	25	E 36/ 25 B-FR	230	8,2	10	T73	38
	30	E 36/ 30 B-FR	230	10,2	16	T73	46
	40	E 36/ 40 B-FR	230	14,0	16	T73	46
	50	D 36/ 50 B-FR	2x400	10,5	16	T73	50
	60	D 36/ 60 B-FR	2x400	12,6	16	S76	86
	80	D 36/ 80 B-FR	2x400	15,9	16	S76	86
	100	D 36/100 B-FR	3x400	11,0	16	S76	97
	125	D 36/125 B-FR	3x400	14,0	16	S77	135
	150	D 36/150 B-FR	3x400	16,3	20	S77	150
	180	D 36/180 B-FR	3x400	19,5	20	S77	150
48	20	E 48/ 20 B-FR	230	8,6	10	T73	33
	25	E 48/ 25 B-FR	230	11,4	16	T73	49
	30	E 48/ 30 B-FR	230	14,3	16	T73	49
	40	D 48/ 40 B-FR	2x400	10,8	16	T73	54
	50	D 48/ 50 B-FR	2x400	13,7	16	S76	72
	60	D 48/ 60 B-FR	2x400	15,9	16	S76	85
	70	D 48/ 70 B-FR	3x400	10,2	16	S76	98
	80	D 48/ 80 B-FR	3x400	11,6	16	S76	98
	90	D 48/ 90 B-FR	3x400	13,0	16	S77	128
	100	D 48/100 B-FR	3x400	14,5	16	S77	130
	120	D 48/120 B-FR	3x400	18,0	20	S77	148
	140	D 48/140 B-FR	3x400	22,0	25	S77	170
Battery	Nominal		M a i n s c o n n e c t i o n				

Voltage V	Current of Unit A	Type	Voltage V	Current A	Fuse A	Housing Type	Weight kg
80	160	D 48/160 B-FR	3x400	24,6	25	S77	180
	180	D 48/180 B-FR	3x400	26,0	35	S77	202
	200	D 48/200 B-FR	3x400	29,0	35	S77	214
	225	D 48/225 B-FR	3x400	32,0	35	S77	240
	20	E 80/ 20 B-FR	230	14,0	16	T73	47
	25	D 80/ 25 B-FR	2x400	11,4	16	S76	71
	30	D 80/ 30 B-FR	2x400	13,7	16	S76	71
	40	D 80/ 40 B-FR	2x400	15,9	16	S76	84
	50	D 80/ 50 B-FR	3x400	11,8	16	S76	97
	60	D 80/ 60 B-FR	3x400	14,2	16	S76	111
	70	D 80/ 70 B-FR	3x400	16,6	20	S77	150
	80	D 80/ 80 B-FR	3x400	19,0	20	S77	150
	90	D 80/ 90 B-FR	3x400	21,0	25	S77	179
	100	D 80/100 B-FR	3x400	23,0	25	S77	179
	120	D 80/120 B-FR	3x400	29,0	35	S77	223
	140	D 80/140 B-FR	3x400	34,0	35	S77	226
	160	D 80/160 B-FR	3x400	39,0	50	S77	278
	180	D 80/180 B-FR	3x400	42,0	50	S78	279
	200	D 80/200 B-FR	3x400	46,0	50	S78	308
	225	D 80/225 B-FR	3x400	52,0	63	S78	318

Housing dimensions)

	T73	S76	S77	S78
Width (mm)	550	555	660	800
Depth (mm)	370	425	500	503
Height (mm)	400	820	945	1150